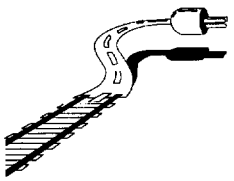

Station Cars

Electric cars used by transit riders for improved access to mass transit

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Station cars are the first market niche for electric vehicles (EVs) that will be operated by the general public. They are battery-powered cars used by transit riders to and from transit stations. They may be used for the home and/or work end of trips, for personal business, shopping, social or recreational activities. Station cars convert convenient mass transit station-to-station service into ultra-convenient door-to-door service. Station cars are normally charged at the station, but can be easily charged elsewhere from a normal outlet.

Society will benefit from reduced air pollution, less noise, less congestion (because mass transit becomes more attractive to more people), and less dependence on foreign oil. Station cars can substitute for second and third cars in multiple car households. They can be first cars in no-car households. Advanced reservation systems will allow for station cars to be available throughout metropolitan areas. They can be part of employer programs and can represent emissions credits for sponsoring organizations.

A sizable market for station cars exists already among commuters. In just eleven U.S. metropolitan areas, over 250,000 parking spaces per day are devoted to commuters who drive to a station to access mass transportation. Even where parking fees are levied, facilities often fill to capacity by 7:00 a.m.

Station cars can be effective in conjunction with any mass transportation system, and are not limited to urban rail systems. Park and Ride facilities serving express bus services are being increased in several urban areas. Park and Ride facilities for ferries in New York, San Francisco and Seattle are appropriate for station cars.

Transit agencies across the United States are joining with electric utilities to undertake local station car demonstrations. In 1992, to facilitate the introduction of station cars, the American Public Transit Association formed the Electric Station Car Task Force, and the Electric Power Research Institute (the research arm of the electric utility industry) sponsored the start-up of the National Station Car Association.

The Transit Development Corporation (the transit industry's research organization) will sponsor the National Station Car Demonstration (made up of local demonstrations) and organize buys of large numbers of cars. These buys will be enhanced by purchases of EVs for other transit uses (operations, administration, and security) and uses by government agencies, schools, and utilities. The National Station Car Association will provide the overall technical guidance to the demonstrations and perform the R&D necessary to move the concept toward full-scale programs in many cities.

The Market Demonstration

Demonstrations beginning in 1994 will be pilots for those to follow in 1995 through 1997 as the table shows. These demonstrations represent the station car market in its infancy. Initially, station cars will be assigned to carefully selected drivers, often employees of the transit agency, electric utility, or other firms involved in the demonstration.

Market Phase and Timing	Market Characteristics
Pilot Demos, 1994, Up to 100 cars	Four to six regional demonstations, each of 5 to 50 vehicles at a limited number of local stations
Full Demos, 1995-1997, Up to 3,000 cars	Many regional demonstations, each of 25 to 100 vehicles at local stations, some vehicles will have multiple users per day
Intermediate, 1998-1999	Small fleets of vehicles at hundreds of stations across the country, many vehicles have multiple users per day
Mature, 2000+	Metropolitan area-wide programs, large fleets of vehicles focused on both ends of all types of transit trips at a large percentage of transit stations

Today's electric car, once safety certified, will meet all of the requirements for station car trips: good acceleration, travel at highway speeds and range of at least fifty miles between charges. The demonstrations will focus on the best vehicles and system components and will challenge car makers for near term improvements. Work is already underway for increased range through improved batteries, higher efficiency motors and controllers, climate control systems that use much less energy, smart systems that better manage on-board energy, composite vehicle designs to reduce weight, more integrated vehicle designs to maximize performance and faster battery charging systems.

The Intermediate Market

In the intermediate market, the expectation is that thousands of station cars will serve transit riders at hundreds of stations across the country. Some ground-up, purpose-built electric station cars can be expected. While during the demonstrations the need for infrastructure was limited, during this

Initially station cars will be conversions, such as this conventional car upfitted to an EV. This vehicle can easily go 50 miles on a battery charge and is fully freeway capable.

market phase sophisticated billing and reservation systems become necessary and fast charging will be required at some locations.

Most users will lease the vehicles for periods of a week, a month, or longer, but experimentation with hourly and daily rentals is expected. Employer sponsored programs will emerge. With station cars, the costs of charging, insuring, operating, and parking will be included in the cost of the use, a cost which will be competitive or below the costs of owning and operating one's own vehicle for the station trips.

Consumer demand for station cars will impact transit planning in the intermediate station car market. As an example, plans for the light rail system in Portland to quadruple track miles are underway. Designing the parking areas for station cars is under consideration. Station cars could be queued, thereby increasing parking density and delivering more commuters per square foot of parking lot. If vehicles are used by more than one patron a day, then the per square foot of parking delivers multiples of passengers.

Users of station cars will receive many benefits. The cars will be queued near the station entrance so users have a reserved spot to park no matter the time of day. They will not have to make car or insurance payments. They will never have to visit a fueling station or an auto mechanic. One charge will cover all the services.

Sometime near the beginning of the new century the mature market phase of station car service will emerge. Rapidly growing fleets of station cars, adjacent to a large number of mass transit stations, will allow transit to finally become a true door-to-door transportation service for any type of trip. Air quality will be vastly improved as more station cars reduce emissions.

Electronic access and payment systems will allow use by anyone with sufficient credit and a driver's license. These systems will be fully integrated with the access and fare paying systems of the transit system. Most vehicles will be available to rent on a per trip basis. The same vehicle may be rented several times during one day by different people making short trips to and from the station. Commuters will be able to rely on mass transit more often because of the flexibility provided by station cars. Transit riders would be able to pick up and drop off cars at stations best suiting their transportation needs. Cars will be electronically smart, including an on-board diagnostic system that will report needed maintenance to the central computer. Road calls will be immediately telemetrically dispatched. The system may even "verbally" report vehicle problems, road conditions, and other information to the driver. If the station car is low on charge, its on-board computer shows through geo-mapping where the closest station car site is so that it can be exchanged for a fully-charged vehicle.

Vehicles will begin to use sets of parallel charging queues at the station. These will be first-in first-out queues where the arriving user leaves the car at the end of the queue and the car emerges at the front of the queue. It will be automatically and fully charged (similar to an automatic car wash where the vehicle emerges clean) just in time for the next user. The queue will be integrated with the reservation system and will allow cleaning and routine maintenance and repairs. The queue will charge the battery as slowly as possible (to extend its life) but quickly enough to have the car at the front of the queue when needed.

The Ultimate Market

Station cars may be thought of as the beginning of a new flexibility in urban trip making. In the future, station cars will be queued at airports and other locations where keeping a private vehicle is costly and space consuming. The station car need not be a utilitarian sedan. Some could be sports cars, some could be upscale, some could be pick-up trucks to allow for goods hauling. Station cars will provide daily options that individual car ownership does not.

Station cars will free up land and building space now devoted to parking one-user private automobiles. They will make owning fewer household vehicles possible while still adding flexibility to trip making. Cities and suburbs will be cleaner, quieter and more livable.

FOR FURTHER INFORMATION CONTACT:

Frank J. Wilson
Chairman, APTA Electric Station Car Task Force
800 Madison Street
Oakland, CA 94607

Martin J. Bernard III, Executive Director
National Station Car Association
963 Hillcroft Circle, Oakland, CA 96410